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ORGANIZATIONAL STRUCTURE AND PERFORMANCE IN DUTCH SMALL FIRMS

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ABSTRACT

The relationship between organizational structure and performance in small firms has received relatively limited attention over the last few decades. In understanding small firm performance this seems to be a serious omission. In this paper, we first present the rationale for including organizational structure in the analysis of small firm performance. Then, from the literature on organizational theory, we retrieve several dimensions that may be postulated to describe organizational structures of small firms. Based on the study of a stratified sample of 1411 Dutch small firms we show that nine structure stereotypes can be delineated. We further investigate the relevance of the empirical taxonomy by looking at the relationship with firm performance in terms of sales growth, profitability and innovativeness. Eventually, we conclude that organizational structure indeed matters and that it deserves to be taken into account in models and future analysis of small firm performance.

JEL Code: M21, D21

Key Words: Organizational structure, Small firm performance, innovativeness.

INTRODUCTION

An important strand of the small business economics literature deals with understanding the determinants of small firm performance (e.g. Kimura, 2002; Audretsch, 2001; Robson and Bennett, 2000; Roper, 1999). In broad terms, firm performance is determined by the success of selling products and services in the market, and, by the effectiveness of organizing and transforming inputs (such as labour and capital) into sellable products and services (Nickell, 1996; Nickell et al, 1997). For most small firms labour is the most important input (Heskel, 1999), which means almost by definition that organizational structure may be very relevant to small firm performance.

In this article, we study the organizational structures of small firms and the link between these structures and the performance of the respective firms. One of the most elementary decisions a small firm owner or manager has to make is the design of the firm's organization. As soon as a small firm hires employees, some kind of organizational structure develops. The actual design of this organizational structure is a mix between deliberate choices and unconscious, emergent developments. What evolves is a system of responsibilities, privileges and coordination mechanisms. The outcome of this organizational design process may be expected to be an important determinant of the performance of firms (Mintzberg, 1979; Jensen and Meckling, 1992; Chaston, 1997; Athey and Roberts, 2001).

Theoretical support for the relevance of organizational structures can be found ubiquitously. Sociologists, management scholars and economists have written on the subject. Firstly, many business school textbooks cover the topic in order to explain the essentials of organizations and management (e.g. Mintzberg, 1979; Robbins, 1990;

Burton and Obel, 1998). Several strategic management scholars have performed specific empirical studies on related topics (e.g. Wolf and Egelhoff, 2002; Lin and Germain, 2003). In this context, Doty et al (1993) explain that organizational design theory has developed from a normative, universalistic approach (promoting 'the best structural form'), via a normative contingency theory approach ('the best structural form exists given specific sets of conditions'), to the notion of equifinity ('in a specific situation, multiple good solutions exist'), Unfortunately, the empirical relevance and rigor of the normative theories has not always been clear. Intuitively we agree with Donaldson (1987) when he states that a good fit means better performance. Studies that actually investigate performance in relation to organizational structures are relatively rare and do not find clear relations between structure and performance (e.g. Child, 1976; Covin and Slevin, 1988). The majority of studies are of a descriptive and predictive nature (Child ,1972; Pugh and Hickson, 1976) or they focus on one aspect of structure (e.g. Axley, 1992). Burton and Obel (1998) collected about 450 rules for organizational design and put them into a consultant knowledge base. This could give the impression that the organizational structure problem is a done deal: put in your characteristics and your preferred structure is clear. However, for many of the rules it is unclear how they were derived: by rule of thumb, logical deduction or empirical research. Moreover, most rules are based on the study of large firms only.

In mainstream economic literature, organizational structure has received exceptional attention over the last few years (e.g. Garicano, 2000, Maskin et al, 2000; MacDonald and Marx, 2001; Stein, 2002; Garicano and Hubbard, 2003). The topic has been on the agenda starting Williamson (1967), who pointed at diseconomies of scale caused by unbalances between firm size and organizational form. In subsequent years there

was attention to modelling organizational structures and the link with performance. Particularly, Arrow (1974) discusses the limits of the firm and shows that specialization leads to an additional need for coordination. Cremer (1980) studies the degree to which coordination mechanisms reduce uncertainties. Sah and Stiglitz (1986) investigate the consequence of (hierarchical) structures on the quality of decision making. Becker and Murphy (1992) focus on specialization and the division of labour, concluding that coordination costs determine efficiency of organizational structures. Aghion and Tirole (1997) investigate formal and real authoiry in organizations, particularly in relation to other coordination and communication mechanisms. In summary, great economists have tried to contribute to theory and thinking on the link between organizational structure and performance.

In this study, we want to contribute to the above discussions. We search for insight in the relevance of organizational structure in small firms. Many studies agree that organizational size is one of the variables most closely related to organizational structure (for a review: Kimberly, 1976). Nevertheless, studies that actually focus on, or even include, small firms are scarce (e.g. Chaston 1997, Caruana 1998, Johnston 2000). The studies that do investigate organizational structures in small firms mostly have a limited empirical base (50 to 250 cases), they pay attention to very few aspects of organizational structure, and they do not look into differences between various size classes. As a result, small firms are most frequently typecast as having ‘simple structures’ (Mintzberg, 1979). Theories of transaction costs and agency problems point in a similar direction. This study presents a quantitative study into the occurrence of structures of various types in small firms. We gain insight in the occurrence of typical organizational structures in small firms and we illustrate some of the impact of small firm structures on performance.

DIMENSIONS OF ORGANIZATIONAL STRUCTURE

In this section, we present a brief review of several well-cited authors that have tried to define a coherent set of organizational structure variables (Pugh and Hickson, 1976; Mintzberg, 1979; Dewar et al, 1980; Geeraerts, 1984; Robbins, 1990; and Burton and Obel, 1998).

Broadly speaking, organizational structure concerns (1) *work division*, the distribution of tasks and activities, and (2) *coordination mechanisms*, which includes standardization and formalization. The various authors use somewhat different dimensions of organizational structure. The early studies use specialization to describe how tasks are distributed among firm members. Geeraerts (1984) distinguishes specialization and differentiation (also referred to as departmentalisation). They both concern the 'complexity' of the organizational structure. As regards to the importance of separate attention to the locus of authority in decision-making ('centralization') and the relevance of codes and procedures for coordination ('formalization') most authors agree. A final dimension describes the way firms organise day-to-day (partly informal) coordination between individuals and departments. In this context, in line with Galbraith (1973), Mintzberg (1979) distinguished three main types of coordination: direct control, mutual adjustment and standardization. As said, in broad terms, specialization and decentralization are about how specific tasks and authorities are distributed in the organization, i.e. *the work division*. Formalization, standardization and coordination are subsequently about controlling and optimising organizational procedures, i.e. *the coordination mechanisms*.

CONFIGURATIONS

Miller and Friesen (1986) have argued that multivariate interdependencies in structure (and strategy) tend to manifest themselves in so-called Gestalts. Max Weber already introduced the Gestalt 'machine-bureaucracy' proposing that specialization, formalized rules and procedures and an extensive hierarchy are positively related, and, that each of these structuring variables are negatively related to the centrality of decision making (see also Blau and Schoenherr, 1971). Other famous examples of configurations are the typology of Burns and Stalker (1961), who distinguish between organic and mechanistic organizations; Pugh and Hickson (1976), who propose a sevenfold classification of organizational structures; and Mintzberg (1979), who introduces five structural configurations ranging from a 'simple structure' to a 'multidivisional form'. Sometimes these configurations have been interpreted as ideal types (e.g. Mintzberg 1979), in other cases they were handled as observed, positively determined types (Pugh and Hickson 1976). Miller and Friesen (1980) demonstrate that changes (or stability) in organizational structure dimensions tend to occur together, or follow one another after brief intervals (in order to maintain an appropriate balance or 'configuration' of organizational structures). An important limitation of many of these typologies is that they are based on case studies and surveys of large firms. The small firm is often positioned as a caricature in one of the types, such as Burns and Stalker's '*organic organization*' or Mintzberg's '*simple structure*'.

RESEARCH METHOD

Three times a year, about 2,000 entrepreneurs of Dutch firms with less than one hundred employees participate in a Dutch small firm survey called the 'MKB panel'. The survey waves are executed by means of 15-minute telephone interviews. The purpose of the survey cycle, which runs since 1999, is to gather systematic information about the attitudes, behaviour and performance of Dutch small firms. The sample is stratified in three size-classes and nine economic sectors. The sectors and size classes are sampled in equal strata[1]. For each of the firms in the sample, control variables are available, specifically rather rudimentary measures of size, type of economic activity and location. For this study, a questionnaire was designed based on the theory of organizational structure and design outlined above. We have used 22 items and several more open questions on performance in several years after measuring organizational structure. 3-point Likert scales are used in this study, since extensive test interviews show that in telephone interviewing respondents are unable to mentally map and repeatedly apply 5-point scales, let alone 7-point scales. Interviewees are strongly inclined to answer in their own (select) 3-point subscale.

For the present investigation of organizational structure, we have a sample of 1411 Dutch small firms that employ at least one person next to the owner (i.e. to have at least some sort of basic work division and coordination). As said, the firms are drawn from the population of Dutch small firms based on 27 equal strata by sector and size class. Response rates for the base wave on organizational structure are 72%. A letter by regular mail introduces the telephone interviews and the reported response rate is based on a maximum of three rounds of call and appointment attempts.

RESEARCH DESIGN

Our data analysis consists of four steps. Firstly, we perform a factor analysis on the various items on organizational structure in the survey. Based on the resulting and reliable factors, we highlight several key features of the prevailing organizational structures of small firms. Then, by way of an elaborate cluster analysis, we investigate the occurrence of configurations of organizational structures. Finally and importantly, we show that there are systematic consequences of being a firm with a particular type of organizational structure. Regressions per type of firm are executed to investigate the comparative performance given size and sector. This evaluation of performance enables us to test several of the hypotheses that derive from the literature. Given the range of other topics tackled in the consecutive surveys many more topics and hypotheses could have been studied in combination with organizational structure and performance. Time and space limitations however have forced us to restrict ourselves to performance in terms of sales growth, profit-to-sales ratios and innovativeness.

HYPOTHESES

Organizations may be typecast as hierarchies of various forms. The multidivisional-form (M-form), the unitary-form (U-form) and the matrix organization are the best-known types (Harris and Raviv, 2002). In an M-form, separate departments exist for different sets of products or customers. For large firms these departments are often referred to as 'divisions'. Within a U-form, separate departments exist for different functional specializations. Finally, a matrix organization combines both dimensions of work division. For small firms, one would expect the complexity to be very limited.

[1] Size classes are 0-9 employees, 10-49 employees and 50-99 employees. Sectors are: Manufacturing, Construction, Wholesale and retail, Hotels and restaurants, Transport, Business services, Financial

Based on coordination and transaction cost arguments, the above structures are expected to be absent or very rare and inefficient in small firms. This leads us to the main hypothesis of this study. The larger the firm, the more attractive and effective it is to develop a complex structure, which leads us to formulate three more hypotheses.

H1. Small firms occur in a limited variety of organizational structures

H2. Highly departmentalised firms will be large

H3. Smaller, yet highly-departmentalised firms will not perform well

H4. Larger, yet non-departmentalised firms will not perform well

Alternative theories, for instance team theory (Marshak and Radner, 1972), propose that in many contexts it is efficient for firms to decentralize authority and information processing (Radner, 1992, Lenox, 2002).

H5. Small firms with a strongly decentralized structure perform well.

Alternatively, Alchian and Demsetz (1972) posit that hierarchies are a response to incentive problems associated with team production. They suggest that division of labour and centralization are needed. Along this line upper-level individuals specialize in monitoring lower level 'production' workers (cf. Calvo and Weillisz, 1978).

H6. Small firms strong centralization and vertical specialization perform well.

Hart and Moore (1999) suggest hierarchies may be viewed as chains of authority in decision-making. The manager-entrepreneur in this context is a (central) coordinator of workers in (multiple levels of) specialized production (see also Cremer, 1980).

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services, Personal services and Non-private (includes healthcare, farming).

H7. Hierarchical, centralized structures with strongly specialized employees perform well.

Following Grossman and Hart (1986) and Garicano (2000) another motivation for division of work lies in the opportunities to exploit (local) increasing returns to scale for specific (scarce, complex) skills. This may very well call for sophisticated coordination of work.

H8. Firms with highly specialized workers will be larger

H9. Firms with highly specialized workers will perform well.

Given that under uncertainty this coordination may be problematic, an opposite incentive for diversification and simple structures is also present (Garicano and Hubbard, 2003).

H10. Non-specialized, simple organizational structures perform well

Contingency theory proposes that different organizational structures are appropriate given the requirements of the different contexts (Burns and Stalker, 1961).

H11. Given contextual conditions, different types of organizational structures may perform better.

Doty et al (1993) suggest that given uncertainty in most circumstances multiple 'good' and no best solutions exist.

H12. Given contextual conditions, different types of organizational structures will perform equally well, particularly in the longer run.

VARIABLES

As explained above, we want to include five 'structural dimensions' in our analysis: departmentalisation, specialization, decentralization, coordination and formalization. In principle, it would have been preferable to only use existing, validated scales. For several reasons, however, we have chosen to use a different and more limited set of items. Firstly, many previous studies have focussed on only a few of the structure dimensions. Secondly, most studies were aimed at large multinational companies, which obviously is a different audience than our small firm entrepreneurs. The transferability of proven scales is therefore a bit questionable. For example, Pugh et al (1968) use 55 (sub-)items to measure formalization alone, while their centralization questions are repeated for 11(!) different types of decisions. Dewar et al (1980), use 9 items to measure centralization. Morrison and Roth (1993) use 10 items to measure centralisation, 8 to measure specialisation and another 6 to measure formalisation. Such numbers of items are detrimental to the response rates for our method of research. It is simply infeasible for telephone interviewing. Our questionnaire had to be short and easy to understand. Large number of items cannot be covered in telephone surveys since the quality of responses sharply decreases. The major advantage of telephone surveys is of course that response rates can be achieved that are infeasible with other methods of research. Response rates are particularly good in a committed setting as in this study. Furthermore, many of the existing scales on organizational structure are less suitable since they were developed for employees as respondents instead of (small) business owners (e.g. Caruana et al, 1998). Thus, instead of choosing a limited number of specific items from well-cited studies (which would force us to be incomplete), we reformulate items in short and general statements that *are* suitable for telephone interviewing. An additional benefit of this

procedure is that the newly developed items are relevant to firm in any sector, which is important since we would like to derive conclusions on small firms in as general terms as possible. The developed questionnaire was tested in about ten pilot interviews with small firm owners and some employees to get some indication of robustness. Several questions were reformulated or dropped in this process. In particular, it was decided at this stage to limit the number of items to twenty-two instead of thirty-nine.

INSERT TABLE 1 HERE

Table 1 presents an overview of the items that are used in this study. Firstly, the dimension of departmentalisation is covered by seven items, representing vertical differentiation and horizontal departmentalisation (Robbins 1990, Rivkin and Siggelkow, 2003). The three items relating to vertical differentiation are indicators related to the hierarchy and complexity of the organization: the number of separate organisational units, the number of hierarchical levels and the number of managers. The four items relating to horizontal departmentalisation refer to divisional and functional groupings (see e.g. Mintzberg, 1983; Carson et al, 1995).

Secondly, specialization was measured by four items representing specialization of tasks and skills. Two items concern specialization of tasks, also referred to as functional specialization (Pugh et al, 1969; Robbins, 1990). This type of specialization closely links to the concept of job rotation (Dewar et al, 1980). Another two items concern the specialization of skills, also referred to as social specialization

(Robbins 1990). This relates to actual ‘specialists’ and ‘irreplaceable’ personnel {e.g. Mintzberg, 1983).

Thirdly, decentralisation was measured by four items distinguishing authority on a strategic and an operational level. Furthermore, we follow Dewar et al (1980) and Richardson et al (2002) by including items for decentralisation of *authority* and decentralization in *participation* (which of course is weaker). Following Pugh et al (1968), we allow for differences in the nature of (de)centralization for operational versus strategic decisions.

Finally, we include seven items relating to the coordination mechanisms within the firm. Items are included for written procedures (Oldham and Hackman, 1981) and for formal communication (cf. Pugh et al, 1979; Mintzberg, 1983). Furthermore, we include an item representing self-guidance plus four items for personal and impersonal directive mechanisms (Mintzberg, 1983).

The control variables that were included in the questionnaire are measured by industry (9 classes), size (number of employees) and strategy (one item for each generic strategy, based on Porter, 1985).

We used multiple measures of firm performance to reflect the multi-dimensionality of performance. Since some respondents were expected to be unwilling to provide detailed and comparable accounting data, the entrepreneurs were also asked to rate their firm's sales and profit performance relative to the preceding year. Following Dess and Robinson (1984) we included an additional item on the firms profitability compared to similar firms, i.e. competitors.

RESULTS

The twenty-two items on organizational structure listed above combine to nine factors in an unrestricted principal component analysis. In order to arrive at more easily interpretable results Varimax rotation was used. The nine empirically derived components capture critical variations in organizational structure in small firms. Table 2 below shows an overview of contributing item coefficients with an absolute value larger than 40%.

The factors result in orderings that are largely expected: departmentalisation splits into a component of hierarchical complexity and a component of divisional/functional complexity. Specialization splits into task diversity and employee specialization. Decentralization has components for operational and strategic influence. Coordination is the most special case. Formalization and standardization are found to largely overlap (factor 9). Furthermore several less formal coordination mechanisms remain. Direct coordination by the entrepreneur contributes to the hierarchical complexity. Informal team coordination is responsible for a separate component. Self-coordination is the only significant contributor to factor 8. Interestingly enough, both informal team-coordination and self-coordination are apparently rather independent from the other organizational structure items. Furthermore, they vary substantially across small firms (otherwise they would not qualify as ‘independent’ factors).

INSERT TABLE 2 HERE

Based on the contributions to the components above, we directly construct scales for nine dimensions of organizational structure. For each of these constructs Crohnbach's α is acceptable (> 0.6). The scales are direct sums of the set of significantly contributing items per component.

Further analysis of the constructs teaches us that the myth "small firms are informal, unstructured and centralised" appears to be untrue. The larger firms in our sample are more standardised, but considerable variation exists, also among the smaller firms. The departmentalisation of larger firms is more complex, but quite a few of the firms with less employees are pretty complex in their structure. Task diversity decreases and employee specialization increases as small firms are larger, but - once again – a whole range of smaller firms show more specialization than larger ones. For operational decisions, larger firms are a bit more decentralised than smaller ones. For strategic decisions there is *no* systematic difference between various small and medium sized firms, nor there is for self-coordination.

INSERT TABLE 3 HERE

Next, given the variations of the nine constructs, we are interested to learn whether systematic organization types can be delineated. Testing for the optimal number of clusters by way of the sum of squared distances to the cluster centres[2], we arrive at nine typical organization structures, which will be discussed below.

[2] There is a 'kink' in the SSD-plot from introduction of the eighth to the ninth cluster. The sums of squared distances were plotted for two to twenty clusters.

INSERT TABLE 4 HERE

The first organizational structure (*entrepreneur with a 'submissive' team*) is characterized by an authoritarian entrepreneur and several quite independent employees. The employees have limited influence on decision-making. Coordination mainly occurs through informal team processes.

The second structure (*co-working boss with an open structure*) is characterized by employees that are highly involved in operational decision-making. Coordination also mainly occurs through informal team processes. Departmentalisation and specialization are limited.

The third structure (*an entrepreneurial team*) concerns firms characterized by employees closely involved in strategic and operational decision-making. Formalization is low. Coordination occurs through team processes, under substantial specialization.

The fourth structure (*boss - loose control*) concerns firms characterized by independent employees that are relatively uncoordinated. The entrepreneur is not very authoritarian or formal, yet (s)he does make all decisions. Departmentalisation and specialization are limited.

The fifth structure (*boss – tight control*) has few tasks and responsibilities defined beyond that of the dominant entrepreneur-owner-decision maker. Specialization is low, the use of formal and informal coordination mechanisms limited.

The sixth structure (*singular structure*) has few divisional or functional departments. The entrepreneur is important, not extremely dominant, yet employees have limited leeway for self-coordination. Specialization and formalization are rather simple.

The seventh structure (*U-form*) is simple, yet rather strongly hierarchical in structure. Formalization is substantial and employees are rather specialized in their capabilities. The entrepreneur must involve employees in decision-making in order to be sufficiently informed.

The eighth structure (*matrix organization*) is flat, yet rather strongly functionally and divisionally departmentalised. Formalization has to be relatively large for communication and coordination to work well. Decentralization is limited and within departments specialization is low.

The ninth and final structure (*M-form*) is hierarchically structured and departmentalised in divisions. A substantial part of the employees are specialized professionals and involved in decision making. Formalization is substantial, like in the last two organizational structures.

Finally, for the nine organizational structures, we study the performance in terms of sales growth, profit to sales and innovativeness. If structure does not match size and sector, one would expect a lower performance. Below, we present the results in three tables. We show in which sectors the various organizational structures perform relatively well, and, in which they perform relatively poorly. It is interesting and important to note that each of the organizational structures occurs widely across sectors.

INSERT TABLE 5 HERE

In terms of 3-year persistent sales growth, ‘co-working bosses with an open structure’ seem to perform rather well in the construction sector. ‘Entrepreneurial teams’ perform rather well in business services and manufacturing sectors. The ‘M-form’ performs well in financial services. By contrast, ‘singular structures’ in manufacturing and business service sectors are not good for sales growth, neither are entrepreneurial teams in personal services.

INSERT TABLE 6 HERE

Contrarily, in terms of persistently ‘good’ profit to sales ratios, ‘entrepreneurial teams’ in personal services perform well. This also holds for ‘U-forms’ in financial service and leisure sectors. Simple hierarchical structures are good for profit to sales ratios in business services (‘bosses - loose control’ and ‘bosses - tight control’).

INSERT TABLE 7 HERE

Finally, in terms of innovativeness, simple, hierarchical and entrepreneur-dominated firms do not perform well, except perhaps for particular larger organizational structures in business services and manufacturing. M-forms are relatively innovative in financial services and manufacturing, matrix structures are relatively innovative in

services. U-forms appear to be less innovative in wholesale, retail, transport and in the hotel and restaurant businesses. Larger entrepreneurial teams appear to perform well in terms of innovation, except in the construction sector.

CONCLUSIONS

Coupling these results back to the literature and the hypotheses formulated above, we can draw the following conclusions.

To begin with, contrary to our first and main hypothesis, we find small firms to occur in a wide variety of organizational structures. We find organizational structures with various degrees of departmentalisation to coexist. Contrary to the second hypothesis, we find that small firms as well as larger firms may exhibit substantial departmentalisation. Nevertheless, we do find a strong correlation between departmentalisation and firm size. Contrary to hypotheses H3 and H4 small departmentalised or large non-departmentalised firms do not perform systematically worse than large departmentalised or small non-departmentalised firms. In line with Radner (1992) and Lenox (2002), we find that strongly decentralized structures perform well in several contexts, notably in business services and manufacturing. Several rather centralized structures perform equally well though, even in the same contexts. Contrary to our sixth hypothesis and contrary to the seminal work by Alchian and Demsetz (1972), we find that firms with strong centralization and strong vertical specialization only occur and only perform well in relatively simple structures. Apparently, for larger firms strict vertical specialization requires at least some decentralization in order to be efficient. Subsequently, in line with hypothesis H7 and in accordance with Hart and Moore (1999), we find hierarchical, centralized structures with strongly specialized employees to occur frequently and to perform

well in terms of growth. In line with Grossman and Hart (1986) and Garicano (2000), we also find firms with substantial specialization to be larger. In combination with complex coordination mechanisms, M-forms perform well in terms of growth as well, particularly in manufacturing and financial services. Especially the relatively small M-form firms are able to achieve impressive growth figures. Non-specialized, simple organizational structures in business services perform well in terms of profit to sales ratios (Garicano and Hubbard, 2003). Finally, we do not find that there is 'one best way of organizing'. Some organizational structures appear to perform better in specific sectors (hypothesis H11). In line with Doty et al (1993) we find support for the hypothesis H12. Given contextual conditions, different types of organizational structures perform equally well (over the period 2001-2003).

All in all, from this article it is quite clear that the relationship between organizational structure and small firm performance is more relevant and more complex than commonly assumed. Small firms are very diverse in terms of organizational structure, both across sectors and size classes. The analysis here has obviously been rather rudimentary and more thorough analysis is needed. Other features of the context, such as the number of customers, the number of competitors, the number of suppliers seem very relevant interacting variables. Also, the actual use of inputs and assets in the organization would be essential to include in further, more advanced analysis. This study has nonetheless provided clear indications that organizational structures are more diverse and relevant to small firm performance than commonly assumed. Organizational structure should be included in studies aimed at a better understanding the determinants of small firm performance.

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Table 1 Variables in the analysis

Variable description	Type
CONTROL VARIABLES	
line of business	9 classes
size: number of employees	nominal
DIVISION OF WORK: COMPLEXITY 1, DEPARTMENTALISATION	
hierarchy	
separate organizational units	boolean
number of hierarchical levels	scale (max. 10)
number of managers	scale (max. 10)
Divisional/functional configuration	
tasks grouped by product/service	boolean
tasks grouped by customer group/segment	boolean
task grouped by geographical region	boolean
tasks grouped by process	boolean
DIVISION OF WORK: COMPLEXITY 2, SPECIALIZATION	
task diversity	
job rotation: employees fulfil multiple jobs/functions	3 point
job variety: work variety in jobs/functions	3 point
employee specialization	
employee specificity: tasks are specific to employees	3 point
employee replaceability: substitution between employees	3 point
DIVISION OF WORK: DECENTRALIZATION	
strategic decisions	
strategic influence by employees	3 point
strategic autonomy by employees	3 point
operational decisions	
operational influence by employees	3 point
operational autonomy by employees	3 point
COORDINATION: COORDINATION MECHANISMS	
personal coordination	
direct control of owner/manager	3 point
informal team coordination (mutual adjustment through informal communication)	3 point
self-coordination (self-monitoring)	3 point
impersonal coordination	
standardization of activities (fixed work process)	3 point
standardization of goals (specified objectives)	3 point
formalization	
use of formal communication procedures	3 point
existence of written formal procedures	3 point
PERFORMANCE	
Realized sales growth 2001, 2002 and 2003 (dln)	Continuous
Realized profit to sales ratios 2001, 2002, 2003	Continuous
Innovativeness (normalized, based on 7 items, see Meijaard and Uhlaner, 2002)	scale

Table 2 The main components of organizational structure in SMEs

ITEMS	COMPONENTS *1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*
departmentalisation									
separate organizational units	0.649								
number of hierarchical levels	0.690								
number of managers	0.757								
tasks grouped by product/service									-0.455
tasks grouped by customer group		0.633							
task grouped by geograph.region		0.777							
tasks grouped by process		0.423							
specialization									
job rotation			0.492				0.489		
job variety			0.795						
employee specificity				0.483					
employee replaceability				0.789					
decentralization									
strategic influence					0.827				
strategic autonomy					0.874				
operational influence						0.903			
operational autonomy						0.910			
coordination									
direct control by owner/manager	-0.538								
informal team coordination							0.674		
self-coordination								0.821	
formalization									
standardization of activities									0.572
standardization of goals									0.665
formal communicat. procedures									0.681
written formal procedures									0.644

(Principal Component Analysis followed by varimax rotation (convergence after 12 iterations). The kink in the scree plot determined the number of factors. The ninth unrotated factor had an eigenvalue of 0.955. Only contributions exceeding 0.40 are listed.

Table 3 Correlations per component and size

	SIZE	Departmenta-lization 1 (hierarchy)	Departmenta-lization 2 (complexity)	Speciali-zation 1 (task diversity)	Speciali-zation 2 (employee)	Decentrali-zation 1 (strategic decisions)	Decentrali-zation 2 (operational decisions)	Team coordi-nation	Self-coordi-nation	Formali-zation
Departmentalisation 1 (hierarchy)	0.77***	1	0.23***	0.06*	0.18***	0.00	0.12**	-0.03	-0.01	0.34***
Departmentalisation 2 (complexity)	0.26***		1	0.01	0.13**	0.02	0.06*	-0.02	-0.01	0.21***
Specialization 1 (task diversity)	0.15**			1	0.08**	-0.20***	-0.14**	-0.65***	-0.11**	0.11**
Specialization 2 (employee)	0.18**				1	0.03	0.06*	-0.01	0.12**	0.26***
Decentralization 1 (strategic decisions)	0.00					1	0.31***	0.20***	0.11**	-0.01
Decentralization 2 (operational decisions)	0.10**						1	0.16**	0.12**	-0.05*
Team coordination	-0.09**							1	0.12**	-0.06*
Self-coordination	-0.01								1	0.05*
Formalization	0.40***									1

(N = 1411)

Table 4 Typical organizational structures for small firms with 1 to 99 employees

	Clusters A	B	C	D	E	F	G	H	I
	Entrepreneur w/ submissive team	Co-working boss with an open structure	Entrepreneurial Team	Boss - loose control	Boss - tight control	Singular structure	U-form	Matrix organization	M-form
departmentalisation 1 (hierarchy)	-	-	0	-	0	0	+	0	+
departmentalisation 2 (complexity)	-	0	0	0	0	-	0	++	++
specialization 1 (task diversity)	+	+	+	-	-	+	0	0	0
specialization 2 (employee)	0	-	+	0	-	0	+	0	+
decentralization 1 (strategic decisions)	0	0	+	-	-	0	0	0	0
decentralization 2 (operat. decisions)	0	++	++	0	0	0	0	0	+
team coordination	+	+	+	-	-	+	0	0	0
self coordination	++	+	0	++	--	-	0	-	+
formalization	0	-	0	0	0	0	+	+	+
N	82	56	96	83	87	133	403	207	264

(Based on a cluster analysis of all 1411 observations with employees. Scores have been translated from values to deviations from the mean (+ 10% sign. level, ++ 5% sign. level, - 10% sign. level, -- 5% sign. level)

Table 5 Explaining persistent sales growth in 2001, 2002 and 2003; regression analysis for each organizational structure

		C	Ln(size)	Sector dummies		R^2	N
	Type			+	-		
A	Entrepreneur with a 'submissive' team					0.11	42
B	Co-working boss with an open structure			Construction		0.30	34
C	Entrepreneurial Team			Business services, manufacturing	Personal services	0.50	47
D	Boss - loose control					0.09	47
E	Boss - tight control			Personal services	Manufacturing	0.41	42
F	Singular structure	+ 0.23			Business services, manufacturing	0.16	63
G	U-form					0.02	202
H	Matrix organization					0.11	84
I	M-form	+ 0.22	- 0.06	Financial services		0.09	111

Only statistically significant results are reported.

Table 6 Explaining average profit to sales ratios 2001, 2002, 2003; regression analysis for each organizational structure

		C	Ln(size)	Sector dummies		R^2	N
	Type			+	-		
A	Entrepreneur with a 'submissive' team	0.09				0.20	42
B	Co-working boss with an open structure	0.11	- 0.03	Financial services		0.40	34
C	Entrepreneurial Team	0.09		Personal services		0.17	47
D	Boss - loose control			Business services		0.30	47
E	Boss - tight control	0.11	- 0.03	Hotels & Restaurants, Business services		0.36	42
F	Singular structure	0.08	- 0.02			0.11	63
G	U-form	0.05		Financial services, Hotels & Restaurants		0.14	202
H	Matrix organization	0.09				0.16	84
I	M-form	0.10	- 0.02			0.10	111

Only statistically significant results are reported.

Table 7 Explaining average innovativeness 2001, 2002, 2003; regression analysis for each organizational structure

		C	Ln(size)	Sector dummies		R^2	N
	Type			+	-		
A	Entrepreneur with a 'submissive' team				Personal services	0.19	42
B	Co-working boss with an open structure					0.32	34
C	Entrepreneurial Team		0.05		Construction	0.30	47
D	Boss - loose control	-0.30	0.06	Business services		0.43	47
E	Boss - tight control	-0.29	0.05	Manufacturing		0.33	42
F	Singular structure	-0.15		Business services		0.18	63
G	U-form				Wholesale & retail, Hotels and catering, Trransport	0.08	202
H	Matrix organization	-0.16		Personal services, business services, manufacturing		0.25	84
I	M-form			Manufacturing, Financial services		0.25	111

Only statistically significant results are reported.